INFILL AND RESIDENTIAL DEVELOPMENT STUDY
TREE PRESERVATION TEAM
RECOMMENDATIONS

TP 1
REDUCE GRADING TO INCREASE TREE PRESERVATION

ISSUES: Increase tree preservation; reduce clearing for new construction; reduce grading.

IDEA: Reduce the amount of on-site grading which is required to meet drainage requirements through a revision to the runoff coefficients used to calculate stormwater drainage requirements in order to provide an incentive for tree preservation.

RESEARCH: A review of the grading requirements in the Public Facilities Manual was conducted by staff. The methods of dealing with grading and drainage issues and the methods of calculating the amount of stormwater required to be detained were discussed. In a more general discussion on grading and tree preservation, input on various grading and preservation schemes was gathered from a private contracting company that conducts site grading activities for new development and from a private engineer that designs new development projects.

ANALYSIS: Tree removal for grading to attain positive drainage around existing and proposed structures is a necessary part of the construction process; however, trees and forested areas provide stormwater benefits by intercepting rainwater and providing ground where rainwater can infiltrate rather than run off. Incentives are needed to provide for greater tree preservation, while maintaining adequate drainage for both on and off-site properties.

While tree removal for land development is necessary for the construction of structures, utilities, roads, and other site features, and for the grading of the site to provide positive drainage and tie-ins to adjacent contours and site features, site topography and existing soil types are two of the most limiting factors when attempting to minimize site disturbance.

Site topography impacts a designer's ability to preserve trees and forested areas in several ways. The first site features considered when designing a site are sanitary sewer access, stormwater management, and road access and layout. These physical constraints are the first ones considered as they are all dependent in some way on topography. The least expensive method for house construction is one where the house pad locations are designed to allow gravity flow to the public sanitary sewer system. Stormwater must be managed in such a way as to maximize the use of the natural topography, achieve positive drainage away from structures, both on-site and off-site, while at the same time minimizing grading. Road grade minimums are set by the Virginia Department of Transportation and must be respected throughout the site. All of these factors influence the ability to preserve natural areas, as all requirements must be coordinated throughout the site.

Another factor that influences the designer's ability to preserve trees is the necessity for the removal of the existing topsoil. The topsoil in the northern Virginia area has so much organic matter that it must be removed before structures and roads can be built. Organic matter is not

capable of adequate support for structures so it must be removed and stockpiled on-site or trucked away. Most designers attempt to provide a stockpile location on-site so that the topsoil can be preserved and spread over the lots later to help stabilize the soil. Trucking topsoil off-site can be very expensive because, for building purposes, it is not desirable.

The market influences many design decisions. When the market is good and homes are selling fast, developers are more concerned with maximizing lot yield and utilizing the fastest construction methods available. In slower markets, more attention can be paid to the aesthetic value of a product and how to compete with other builders producing similar products.

A common factor in site design decisions is consumer preference. Not every home buyer wants to have a wooded lot; they have liability concerns and concerns regarding the future options for their property. Many want to add decks, play equipment, patios, and swimming pools. Some simply want to have open lawn areas for recreation. These amenities may be limited by existing trees and the topography that was maintained around their home to preserve the trees. Most homeowners do not want retaining walls on or near their properties due to safety and aesthetic concerns. These consumer preferences play an important role in how a developer chooses to develop a parcel of land.

All of the above factors influence the amount of the existing forest that is preserved on a new development. In order to influence the decisions with incentives for preservation, the method of calculation currently used to determine how much stormwater runoff is required to be retained was evaluated.

The calculations conducted to determine the amount of runoff that is required to be detained were evaluated. One of the factors in the calculation is the "runoff coefficient" which is defined as the ratio of runoff to rainfall. The runoff coefficient is different for different types of surfaces. Impervious surfaces, such as roofs and driveways, have a coefficient of 0.90 or 90%. Lawns have a coefficient of 0.25 – 0.35. A runoff coefficient for forested areas is not provided in the Public Facilities Manual (See Table 6.6). If a runoff coefficient for forested areas was provided, and the coefficient had a value lower than lawn areas, it could be an incentive to provide for more forest preservation. The coefficients for forested areas could also be broken down into forest successional stages, from pioneer forest to climax forest, with a climax forest cover being assigned the lowest runoff coefficient. Low runoff coefficients could also be assigned to areas of jurisdictional wetlands as their water retention and absorption capacity is high.

The potential for removal of forested areas where the low runoff coefficient was used to calculate stormwater detention requirements was also discussed. In order to use the lower runoff coefficient for forested areas the area must be afforded some form of permanent protection through a conservation easement or other perpetual measure.

EFFECTS: This proposed revision to the way that runoff is calculated can be an incentive for tree preservation. If forested areas were preserved and used in calculating the amount of runoff a project was required to detain, thus reducing the amount of runoff that needed to be detained, the preservation of forested areas becomes more desirable. The downside of implementing this recommendation is the potential for future removal of vegetation preserved and used in the runoff calculations.

TEAM RECOMMENDATION: The method for calculating the amount of stormwater that is required to be retained should be revised in the Public Facilities Manual to provide an incentive for additional tree preservation. The method should be revised to allow for variable runoff coefficients for forested areas. When the Public Facilities Manual amendment is prepared, consideration should be given to limiting the use of the revised calculation method to those areas under the protection of a conservation easement or homeowner's open space.